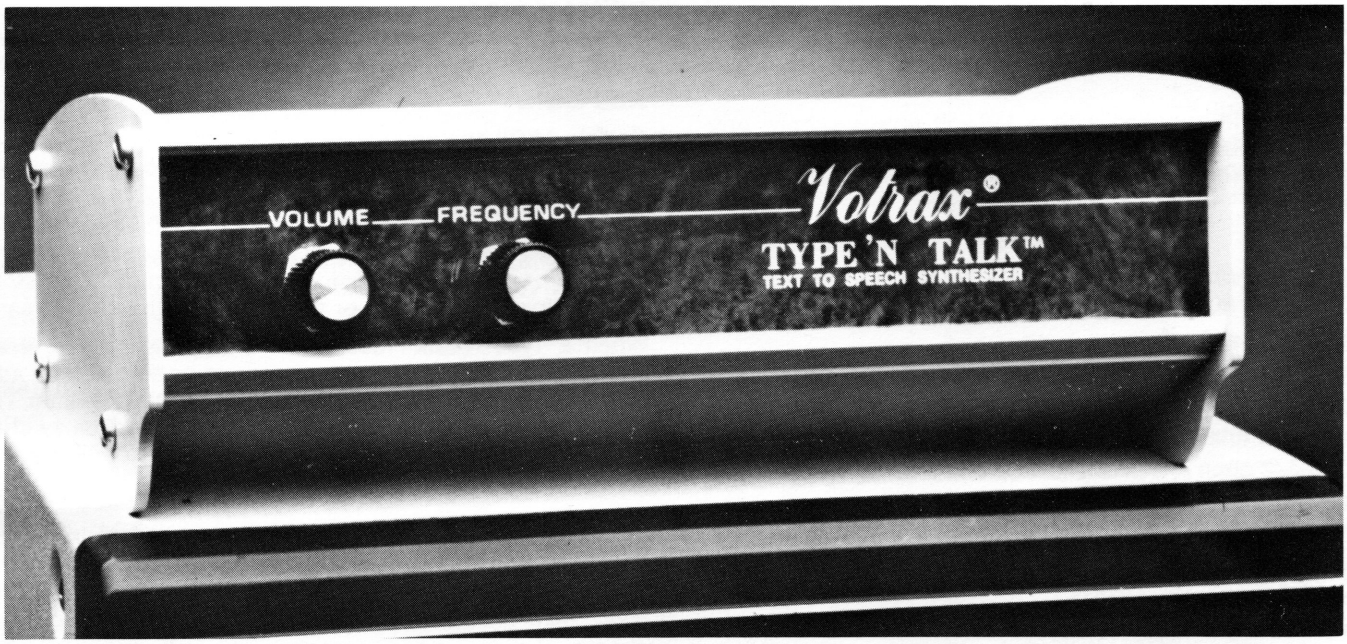
Votrax®, INC.

1394 Rankin
Troy, Michigan 48083

TYPE-'N-TALK™
Text-To-Speech Synthesizer
DATA SHEET



FEATURES:

- Microprocessor based text-to-speech algorithm
- One-watt audio amplifier
- SC-01 speech synthesizer chip (Data rate: 70 to 100 bits per second)
- 750 character buffer
- Data switching capability
- Selectable data modes for versatile interfacing
- Baud (75-9600)
- Data echo of ASCII characters
- Phoneme access modes
- RS-232C interface
- 100-hour elevated temperature burn-in
- Complete installation and programming
- instructions

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GENERAL DESCRIPTION

Type-'N-Talk™ is a completely self-contained text-to-speech synthesizer.

The unit is as easy to program as typing data or programs into a computer. Type-'N-Talk™ may be easily interfaced to a computer, modem or any RS-232C compatible serial device.

It contains a low data rate Votrax® SC-01 Phoneme-based speech synthesizer CMOS chip with unlimited vocabulary and a microprocessor based text-to-speech algorithm.

The Type-'N-Talk™ text-to-speech translations are performed completely independent of the host computer. So the user's computer is free to perform other tasks while speech is in process—with no effect on the throughput of the user's computer.

The vocabulary spoken by Type-'N-Talk™ is unlimited and user defined. The text-to-speech synthesizer creates speech from electronic phonemes using a set of rules that describes English pronunciations.

This unlimited vocabulary repertoire can be inserted directly into the user's software programs much the same way statements to activate a printer or CRT are written. This eliminates the need for any extra memory, RAM or ROM, usually

required for pre-stored vocabulary techniques. Also, it is possible to use a standard high level computer language to drive a Type-'N-Talk™ unit directly. The versatility of uses for Type-'N-Talk™ is unlimited.

PHYSICAL DESCRIPTION

Two voice control knobs, VOLUME and FREQUENCY, are located on the front panel.

The back panel contains:

- ON/OFF push-button switch
- Power Jack with 5-pronged DIN connector
- RS-232C serial port
- Baud select switch
- Speaker jack

INTERCONNECTIONS

Power

Type-'N-Talk™ is supplied with a 110-volt power supply. Any 110-volt AC outlet is appropriate for the power supply. The low-voltage side of the power supply is plugged into the power jack.

Audio

Attach any 8-ohm speaker to Type-'N-Talk™ via the speaker jack.

RS-232C Interface

The unit is provided with an RS-232C serial interface. A 25-pin DIP connector is provided.

Eight signal lines are used:

- Ground (2 pins) — (GND)
- Transmit data — (TD)
- Receive data — (RD)
- Clear to send — (CTS)
- Request to send — (RTS)
- Data carrier detect — (DCD)
- Data terminal ready — (DTR)

Different cable configurations are required, depending on whether the unit is to be used in the Send-Receive or Receive only modes or with a modem only.

Connector Cable

Connector cables for Type-'N-Talk™ may be separately ordered. Cables are in stock for:

- TRS-80 Color (RS-232C)
- Apple II WITH SERIAL CARD (RS-232C)
- Atari 800 with serial interface (RS-232C)

Cables may be specially ordered for other computers.

INPUTTING DATA

Data in the form of ASCII codes can be sent to Type-'N-Talk™ when the handshake line (RTS line) is not busy (at logic 0). There are three classes of data: speech data, mode controls/commands, and null data.

Speech Data

Text is defined as any printable ASCII character not preceded by an ESCAPE code or a phoneme delimiter. All text received is stored in the input buffer until spoken. A subset of the printable characters produce durations of silence or have no effect.

Phonetic data is defined as any printable character enclosed by phoneme delimiters. Phonetic data is stored in the input buffer and can be mixed with text if desired. When data in the input buffer is being spoken, phonetic data is routed directly to the output queue, bypassing the text-to-speech algorithm.

Null Data

Certain ASCII characters will have no effect on the operation of Type-'N-Talk™, and if desired by the user, can be echoed.

UNIT ASSIGNMENT/SELECTION

Up to eight Type-'N-Talk™ units may be daisy chained with a terminal or printer from a single serial interface. Unit select codes allow independent or shared use of the data stream.

When a Type-'N-Talk™ receives an assignment code, it will store the corresponding unit number as its own. It then adds one to the assignment code and transmits this downline. This feature enables multiple Type-'N-Talk™ units in a daisy chain to all be assigned with only one assignment code from the user's computer.

Mode Selection

Several optional modes of operation are available and can be selected by using control codes. These modes can be dynamically set in accordance with the user's application.

PSEND ON

In the PSEND mode, all phoneme codes resulting from a translation of the input buffer are directed to the TRANSMIT DATA output of the Type-'N-Talk™ unit's RS-232C interface.

This feature allows the user's computer to collect the phoneme codes corresponding to the text sent to the Type-'N-Talk™ and create a phonetic library or change the phonemes for different pronunciations.

PSEND OFF

The PSEND OFF mode is the standard mode of operation. All phonemes generated from the input buffer are placed into the output queue where they can be removed by the speech synthesizer upon demand.

Echo

The ECHO feature is used selectively (ON/OFF) to relay data received by a Type-'N-Talk™ unit to the next unit or peripheral in a daisy chain.

Caps On

In this mode, capitalized letters are treated in two different manners. If only the first letter of a word is capitalized, such

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as proper nouns, the word is translated by the text-to-speech algorithm. When two or more letters are capitalized at the beginning of a word, the entire word is spelled out, letter-by-letter. This automatically separates acronyms, which are capitalized, from an English-text string.

For example:

The words "TIN" and "BOB"
are pronounced "tee-eye-en" and "bee-owe-bee"
the words "Tin" and "Bob"
are pronounced "tin" and "bob"

Caps Off

This mode is useful for systems that can only use upper case characters. All upper case characters are folded into their lower case equivalent so all text is translated and not spelled out. Mixed upper and lower case text are treated as all lower case.

Timer Off

Type-'N-Talk™ powers up in the timer on mode. If more than four seconds elapse after a character in a text string is sent to Type-'N-Talk™, the text in the input buffer, at that moment, is translated and spoken.

This input timer is useful when ONLINE applications send a prompting message without being followed by a carriage return. If, for any reason, this timer feature is not desired, it can be disabled with the TIMER OFF command.

Reset

This command resets all Type-'N-Talk™ modes to their power-up settings. The Type-'N-Talk™ assignment number returns to 0.

Commands

BACKSPACE (HEX 8): This command has the effect of deleting the last character in the input buffer.

TALK-CLR (HEX D): This command (carriage return = CR) will cause the data in the input buffer to be spoken, then cleared. There are two alternate ways that TALK-CLR can be executed without sending a CR. The first is the result of an input buffer full condition. The second is the result of the input timer expiring (see TIMER OFF). When text is being translated, data input will be momentarily halted by the RTS signal going TRUE.

STOP-TALK (BREAK = RD spacing for more than one data frame): This command (condition) causes all pending speech output to be cancelled.

VOCABULARY PROGRAMMING

Vocabulary may be entered into the user's computer the same way in which other data or programs are entered. The messages may be typed as literal statements, using standard English text.

Vocabulary programming is as simple as typing a sentence. Once users have pre defined the vocabulary in their software, it can be sent to one or more output systems by simply defining it within that same software.

If the computer is functioning as a Computer Aided Instruction (CAI) system, the software may be adjusted so that the messages intended for display on a CRT will be spoken by a Type-'N-Talk™ instead.

Type-'N-Talk™ can speak messages and function independent of other output devices. Its synthetic speech can draw attention to information that otherwise might be overlooked in a visual presentation.

Software

Computer-aided instruction programs and games are currently being written by nationally recognized suppliers that use the speech synthesis capabilities of Type-'N-Talk™. As the library of available programs grows, Type-'N-Talk™ owners will be advised.

SPECIFICATIONS

PHYSICAL

Width	7.7 inches (19.3 mm)
Depth	5.2 inches (12.3 mm)
Height	3.1 inches (6.5 mm)
Weight	2 lbs. (0.896 Kg.)

ENVIRONMENT

Temperature	Operating:	40 to 100 degrees F (4 to 38 degrees C)
	Storage:	– 35 to 150 degrees F (– 37 to 65 degrees C)
Humidity	Operating:	20% to 90% (no condensation)
	Storage:	5% to 95% (no condensation)

ELECTRICAL

Power	Input to transformer* 120 VAC, 60 HZ, 20 W
	Input to Type-'N-Talk™
(see note below)	—pins 1-3, 26 VAC, 180 mA
	—pin 2, 20 VDC, 50 mA
	—pin 4 is 0 volt reference
Interface	RS-232C compatible, 75-9600 baud
	Frame bits = 1 start, 8 data, 1 stop
Audio	1 watt into 8 ohm speaker, AC coupled

USE ONLY Votrax APPROVED TRANSFORMER PART #01p-1224B

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LIMITED WARRANTY

We warrant, for a period of sixty (60) days from the date of delivery to the original purchaser, that all Votrax® products are free from defect in workmanship and materials under normal use and service, provided the equipment is used in accordance with the user's manual. This Warranty shall be void if the product case is opened or modified. If any failure to conform to this Warranty appears during the sixty (60) day period, we will correct the defect by either suitable repair or replacement, at our option and at our expense, if you return the product. transportation prepaid, to Votrax®, Inc. 1358 Rankin, Troy, Michigan 48083. We will pay the cost of returning the repaired or replaced equipment to you. Any product modification or repair other than that authorized by us in writing will void this Limited Warranty.

THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS, IS LIMITED TO THE DURATION OF THE LIMITED WARRANTY. WE MAKE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED. ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE EXCEEDING THE DURATION OF THE LIMITED WARRANTY ARE DISCLAIMED. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This Limited Warranty does not apply if the product is used for commercial purposes.

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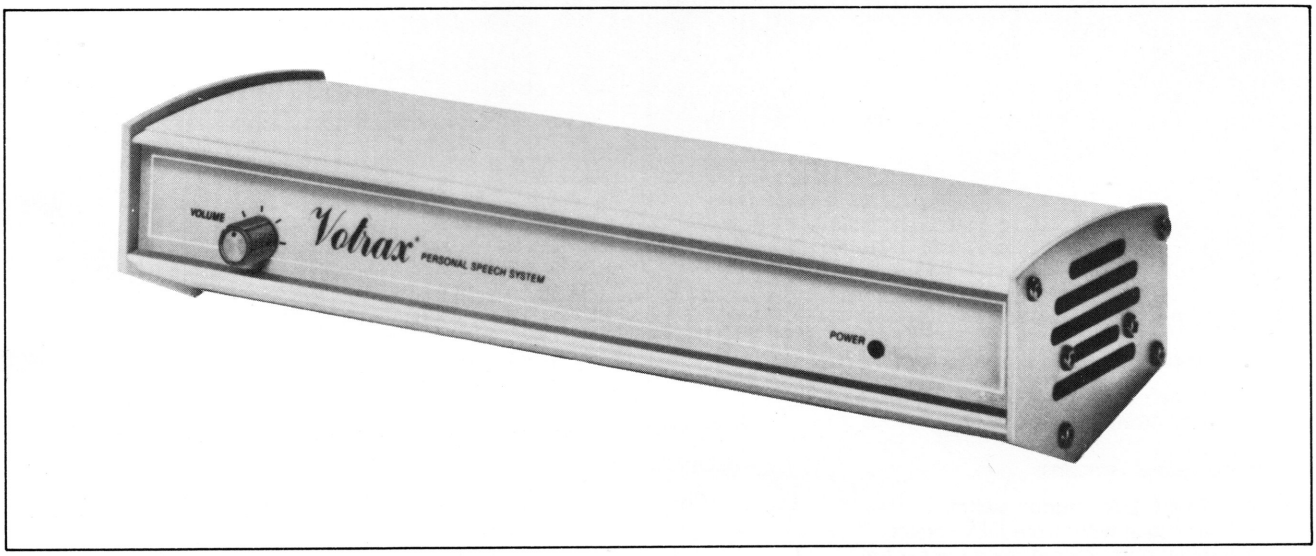
PERSONAL SPEECH SYSTEM

PRODUCT DATA



GENERAL DESCRIPTION

The Votrax Personal Speech System is a completely self-contained text-to-speech synthesizer. This computer peripheral will produce unlimited speech output via literal English, ASCII text input data, whether entered by a keyboard or ASCII communication link.

In addition to producing unlimited speech output, the Votrax Personal Speech System provides comprehensive sound effects and music. Sound effects and three voice, eight octave music synthesis are generated independently of speech which allows the possibility of mixing for special effects. Music and sound effects are produced via a Musical/Tone Generator chip. The ASCII input character sequences can select several preprogrammed tone or chime renditions.

Using a Z80 microprocessor, the Personal Speech System has many capabilities (see FEATURES) which include a Real Time Clock that announces the time on request and a "Big Ben" chime, voice annunciator mode. Also, eight user messages can be set with alarms that may be activated at any specified time.

The Personal Speech System is easy to operate. Designed to look like a printer to your computer, it accepts ASCII data via its serial or parallel ports. The vocabulary spoken is unlimited and user defined. The text-to-speech synthesizer accesses basic sound units of speech (phonemes) using a set of rules that describe English pronunciations. The phonemes create speech output via the Votrax SC-01, a CMOS speech synthesis chip. The translations are performed independently of the host computer which frees the computer for other tasks while speech is in process.

The Personal Speech System is a true peripheral which enables your computer to talk and generate sound effects with minimal use of valuable computer memory. The 3500 character input buffer provides ample buffering in virtually all situations and provides significant enhancement of computer through-put via rapid data transfers.

In addition to operating as a text-to-speech synthesizer and music/sound effects peripheral, the Personal Speech System also can be used as an interface converter. It can operate as a buffered serial to parallel, parallel to serial, serial to serial, parallel to parallel port device for printers, terminals, etc.

A user definable exception table provides the capability to augment the existing translations for mispronunciations and abbreviations. Also frequently used phrases may be represented by a unique character(s).

FEATURES

- Z80 Microprocessor based text-to-speech algorithm.
  —Outstanding translation and pronunciation.
- Internal speaker/external jack for loudspeaker or headphones.
  —Clear sound with ample adjustment on volume.
- Proper number string translation.
  —"154" is pronounced "one hundred fifty four."
- User loadable exception word table.
  —Mispronunciations, abbreviations resolved.
- Programmable speech rate.
  —Allows for more natural rhythm and listener preference.
- Programmable amplitude/fade control.
  —Provides special word/phrase emphasis.
- Programmable inflection levels.
  —Allows various intonation patterns.
- Three channel sound effect and eight octave music.
  —Comprehensive music and sound achieved by ASCII sequence.
- Sound effects/music with voice mixing.
  —Simultaneous outputs for special effects.
- Serial Interface is standard RS-232C.
  —75 to 9600 baud with RTS/CTS and X-on/X-off handshaking.
- Parallel Interface (Centronics type).
  —Operating in tandem with printer possible.
- 3500 character input buffer.
  —Large buffer enhances computer through-put.
- I/O buffering capability.
  —Data can be redirected to printer.
- Parallel/Serial port conversion.
  —Provides a user expansion port.
- Real time voice clock.
  —Automatic quarter-hour enunciator is selectable.
- Verbal power up, self test, and error message prompting modes.
  —Provide user friendly environment.
- Nine chime/tone prompts.
  —Predefined sound effects for easy implementation.
- Selectable phoneme mode.
  —By-passes translator providing direct access of speech chip.

PHYSICAL DESCRIPTION

The Personal Speech System front panel contains:

- Volume control knob
- Power on indicator (L.E.D.)

The rear panel contains:

- ON/OFF push button switch
- Power jack with 5 pin DIN socket
- Parallel port, 25 pin male connector
- RS-232 serial Port, 25 pin female connector
- Configuration setup switches
- External speaker jack, mini (1/8"). An internal 8 ohm speaker is provided.

INTERCONNECTIONS

Power

The Votrax supplied power supply module is connected to a 110 volt AC source. The lower voltage side of the power supply has a 5 pin DIN plug which is connected to the rear of the unit. U.L. listed.

Audio

Audio output is sent to an internal speaker or an external 8 ohm speaker may be attached via the mini-speaker jack. The Personal Speech System has an internal amplifier.

INTERFACE

The data interface may be standard RS-232C serial or Centronics parallel to any appropriate computer, terminal, modem or other serial/parallel compatible device.

Serial data with switch and software selectable baud from 75 to 9600 is supplied to a 25 pin D-subminiature female, which uses the following software handshaking (X-on/X-off):

- Ground
- Transmit data (TD) — (Optional, if output is used)
- Receive data (RD)

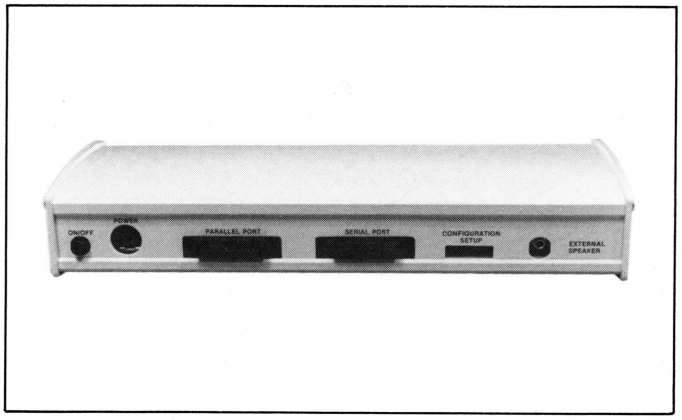
For Serial data with hardware handshaking (most common type) two additional interconnects are required:

- Request to Send (RTS)
- Clear to Send (CTS)

Parallel data (Centronics type), 5 volt, TTL compatible, is supplied to a 25 pin D-subminiature male which uses the following:

- Parallel input data (8 lines), PI0-PI8
- Data strobe (negative pulse)
- Busy output. (Acknowledge not supplied)

Parallel output data, if required (for printer buffer, etc.).



Connector Cable

Connector cables are available for many microcomputers and may be ordered separately for the Personal Speech System. Check with Votrax.

SELF TEST MODE

The Personal Speech System will perform a self test by means of a configuration switch on the back of the unit. With power on, a series of test phrases and tones will be heard indicating that various features of the unit are operational.

INPUTTING DATA

The Votrax Personal Speech System powers up ready to accept standard English text as data for translation into speech. The Personal Speech System also accepts non-speech data. Speech data is of two types:

1. **TEXT** — Standard English text
   (Alphabet characters Aa to Zz, number characters 0 to 9, plus other printable ASCII characters)

   Most other printable ASCII characters are treated as punctuation with the following spoken as indicated:

# "numbers"	& "and"	< "less than"
$ "dollars"	* "star"	> "greater than"
% "percent"	+ "plus"	

2. **PHONETIC** — ASCII characters representing phonemes enclosed by phoneme delimiter characters. Phonetic data bypasses the text-to-speech converter and is used directly by the speech synthesis chip.

Non-speech data is defined in two categories:

1. **NON-SPEECH FEATURE CONTROLS**
   a. Music/sound effects
   b. Real time clock
   c. Alarms

2. **SPEECH FEATURE CONTROLS**
   a. Inflection control
   b. Rate control
   c. Amplitude control

SUMMARY OF CONTROLS

SPEECH FEATURE
CONTROL CHARACTER — @ (Ampersand)

CONTROLLED FEATURES —		
	@R	rate
	@(0-7)	inflection
	@A	amplitude
	@C	conversion mode
	@V	voice mode

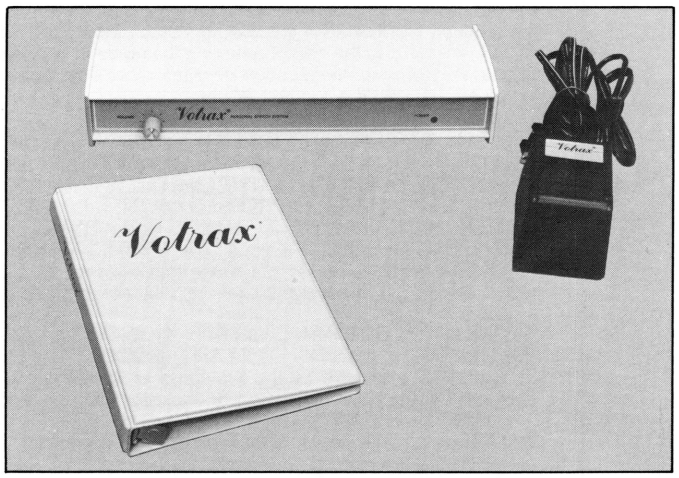
NON-SPEECH FEATURE
CONTROL CHARACTER — ! (Exclamation Point)

CONTROLLED FEATURES —		
	!(1,2,3)	musical tone channel
	!A	alarm set
	!B	baud set
	!E	envelope set
	!F	filter set
	!L	load
	!N	noise set
	!P	prompt
	!T	tempo set
	!U	user program
	!W	wait

ATTENTION FEATURE
CONTROL CHARACTER — [ESC] (ESCAPE CODE)

CONTROLLED FEATURES —		
	[ESC]C	connect I/O
	[ESC]M	mode set
	[ESC]P	powerup
	[ESC]Q	quit
	[ESC]R	reserve memory
	[ESC]S	special characters
	[ESC]T	time set
	[ESC]V	speak version

Additional parameters following each control are required. Instructions for using controls are detailed in the user manual. The Personal Speech System will translate speech without using any control characters, however they may be used to enhance the speech.



SPECIFICATIONS

Physical

Width	12.25 inches
Depth	5.2 inches
Height	3.1 inches
Weight	2.6 lbs.

Environment

Temperature	Operating:	40 to 100 degrees F (4 to 38 degrees C)
	Storage:	−35 to 150 degrees F (−37 to 65 degrees C)
Humidity	Operating:	20% to 90%
	Storage:	5% to 95% (no condensation)

Electrical

Power	Input to transformer* 120 VAC, 60 Hz, 20 W Input to PS System* pins 1-3, 19 VAC, 750 mA pin 2, 20 VDC, 150 mA pin 4 is 0 volt reference
Interface	RS-232C compatible, 75-9600 baud Frame bits = 1 start, 8 data, 1 stop True Parallel compatible
Audio	1 watt into 8 ohm speaker, AC coupled (OPTIONAL)

*Transformer is supplied as standard with P.S.S. as well as User's Manual, Quick Reference Card, and Phonetic Speech Dictionary.

LIMITED WARRANTY

We warrant, for a period of sixty (60) days from the date of shipment to the original purchaser, that all Votrax products are free from defects in workmanship and materials under normal use and service, provided the equipment is used in accordance with the user's manual. This Warranty shall be void if the product case is opened or modified. If any failure to conform to this Warranty appears during the sixty (60) day period, we will correct the defect by either suitable repair or replacement, at our option and at our expense, if you return the product, transportation prepaid, to Votrax, Inc., 1358 Rankin, Troy, MI 48083. We will pay the cost of returning the repaired or replaced equipment to you. Any product modification or repair other than that authorized by us in writing will void this Limited Warranty.

THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS, IS LIMITED TO THE DURATION OF THE LIMITED WARRANTY. WE MAKE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED. ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE EXCEEDING THE DURATION OF THE LIMITED WARRANTY ARE DISCLAIMED. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

WE WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM ANY PRODUCT DEFECT. Some states do not allow exclusion or the limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

This Limited Warranty does not apply if the product is used for commercial purposes.

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FOR IMMEDIATE RELEASE

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Tim Trainor
Trainor Communications, Inc.
(313) 645-1290

VOTRAX, INC.

TYPE-'N-TALK

Product Description

DEC 14 1984

The Votrax Type-'N-Talk text-to-speech synthesizer readily converts computer data programs into an unlimited, user-defined vocabulary through most computer, modem or RS-232C compatible serial devices.

Type-'N-Talk translates text into speech that is 75 percent as accurate as conversational English. The text-to-speech synthesizer can be connected to any personal computer that has an RS-232 serial port.

Priced at $249, Type-'N-Talk creates speech through a Votrax SC-01, CMOS speech synthesis chip and a general-purpose microprocessor. The text-to-speech translations are completed through software programs that predefine the vocabulary of Type-'N-Talk. Since translations occur independently of the host computer, other tasks can be performed by the host computer while speech is in process.

(more)

Ideal for both home and office, the portable, two-pound Type-'N-Talk voice synthesizer can double as a computerized product demonstration device and order taker or as a game and educational aid for children. Many are used as warning systems in burglar alarms or as verification tools for the blind.

Type-'N-Talk also is ideal for computer-aided classrooms. Up to eight units may be connected to one terminal or printer through a single serial interface. As a result, instructors can use synthetic speech to emphasize information that might be overlooked in visual presentations.

Type-'N-Talk text-to-speech synthesizers measure 7.7-by-5.2-by-3.1 inches. They use standard 110-volt, alternating current outlets, and are easily connected to any eight-ohm external speaker.

For more information, contact Votrax, 1394 Rankin Road, Troy, Mich. 48083. Tel.: (313) 588-2050.

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VOTRAX, INC.

PERSONAL SPEECH SYSTEM (PSS)

Product Description

The Votrax Personal Speech System (PSS) is one of the few completely self-contained voice synthesizers that can translate computer data into unlimited spoken English. Its unique, user-definable exception table automatically corrects any words that might be mispronounced by this advanced text-to-speech translator. Votrax PSS actually functions as a "talking printer" with most personal computers.

With appropriate connector cables, Votrax PSS can be used with IBM PCs and compatibles, Apple II, Atari 400/800, TRS-80 Model I, II and color computers, VIC-20/Commodore 64 personal computers, and virtually all other personal computers on the market.

(more)

Priced at $395, Votrax PSS can mix speech output with comprehensive sound effects and three-voice, eight-octave musical tones independently of its host computer. The device has its own memory system, thus allowing the host computer to perform other data- or word-processing tasks while speech and sound is being processed.

The PSS is designed to eliminate the need for extensive phonetic skills, resulting in speech that is 95 percent conversationally accurate. Users merely enter standard English text through a keyboard. A Z80 microprocessor then uses standard pronunciation rules to generate correct word sounds through the Votrax SC-01, a CMOS speech synthesis chip developed by Votrax.

The PSS has 256 programmable frequencies and 16 programmable amplitude levels. This means it can be adjusted for more natural human speech patterns and listener preferences, special word and phrase emphasis, and various inflection levels. In addition, nonspeech feature controls include music and sound effects, and a realtime programmable clock.

The 2.6-pound Votrax PSS measures 12.25-by-5.2-by-3.1 inches, and uses any 110-volt, alternating current outlet. It has an internal speaker, as well as an optional external speaker jack.

(more)

The versatility and unlimited vocabulary of the Votrax PSS make it the ideal solution for many home and business needs. Specific applications include spoken data transmission to handle such business needs as sales orders and financial transfers, narration of graphic displays, computerized product demonstrations, games, and spoken verification of data input that can be used by the blind, educational institutions, and law enforcement agencies.

For more information, contact Votrax, 1394 Rankin Road, Troy, Mich. 48083. Tel.: (313) 588-2050.

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VOTRAX, INC.

Company Description

DEC 14 1984

Since its founding in 1973, Votrax has pioneered the development of voice synthesizers and audio-response devices that translate computer text and data into human sounding speech. Today, its products for business and home use are experiencing rapid sales growth because of increasing demand in the voice response market.

Initially a division of Federal Screw Works, Votrax is a privately held company with more than 1,000 installed business systems that perform financial, manufacturing, order entry, directory assistance, and other tasks. In 12 months as a private company, Votrax accounted for $6 million in sales, and expects that number to increase to $15 million in 1985.

(more)

Votrax's first audio-response products used phonetic synthesis to respond to touch-tone inquiries over the phone. These initial products found a ready market from customers who wanted to provide time-sharing or order-entry services. Product enhancements allowed similar verification and prompting tasks to be done in German and Spanish languages.

LVM Business Products

In 1978, the company introduced the LVM Business Communicator, a pioneering device capable of accepting data sent from a touch-tone telephone or various data entry terminals to a computer. This advanced synthesizer verified information in a natural, human-sounding voice and entered data into a company's computer system. It also simultaneously accepted data from up to 64 lines and used 2,000 words and phrases to deliver verification messages and prompt callers to answer required questions.

Votrax has continually upgraded its LVM Business Communicator to deliver flexibility users require. Enhancements have included an automatic call unit to place out-going calls, and a special module that allows users to simultaneously access computer data while using a touch-tone telephone or listening to the audio response. Full duplex operation was added to enable users to enter data while listening to audio messages.

The LVM Business Communicator has extensive applications in factory paging systems, credit union pay-by-phone services, commercial order entry systems, credit card authorizations, and automated weather reporting.

Entry Into Personal Computer Market

With the explosive growth in personal computers, where more than 10 million have been sold in the past two years, Votrax developed two products that specifically responded to market needs.

Its first product for the home market was Type-N-Talk, a text-to-speech synthesizer that employs a user-defined vocabulary to convert computer and keyboard data into speech. The product speaks conversational English with 75 percent accuracy and can be connected to most personal computers with an RS-232C serial port.

Votrax later introduced the advanced Personal Speech System (PSS), a completely self-contained voice synthesizer that translates data into unlimited spoken English that is 95 percent conversationally accurate. PSS supports both serial and parallel interfaces and has a unique exception table that allows users to customize and store difficult-to-pronounce words in its memory system.

PSS also offers music and sound effects, a 3500 character buffer, and a wide range of inflections and voice speeds. Independently of its host computer, the PSS peripheral can mix sound output with comprehensive sound effects and three-voice, eight-octave musical tones in any manner.

Market Projections

According to John Lauder, Votrax president, the company will continue to lead the audio-response and voice synthesis industries through advanced research and development, engineering, and manufacturing. "Votrax intends to maintain leadership in business data entry and audio response systems for both business and personal computer markets," he said.

He added: "Votrax will continue to advance LVM systems so that they handle a wider range of protocols for an increasing number of terminals and allow computers to communicate with each other. The company will also continue to pursue its total systems approach of adding its products to large mainframe systems.

"In personal computers we plan to introduce customized software products for various vertical markets. The range and capability of PSS and Type-N-Talk will be enhanced to broaden their utility in the marketplace."

Votrax, Inc., is headquartered in Troy, Michigan, and has sales offices in Los Angeles and Atlanta.

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